Device for the Attachment of Free Weights to a Leg

BACKGROUND OF THE INVENTION

[0001] The present invention is directed generally to an exercise apparatus. More particularly, the present invention is directed to an apparatus for exercising with free weights and more specifically a leg attachment apparatus for exercising the leg with free weights.

[0002] Exercising or working out can be accomplished in many ways and for a variety of reasons. People exercise to build and shape the body or to achieve general good health and fitness. Exercise routines can be as simple as walking, running or jogging or can be highly involved and structured to achieve a desired goal.

[0003] Weight training as a form of exercise can be used not only for bodybuilding and toning but also can be used as an aerobic workout. Weight training is typically performed with the use of weight machines or free weights. Both have their advantages and disadvantages.

[0004] While the guided movement of weight machines has its advantages, such as specifically isolating and targeting a few primary muscles, they can restrict the development of stabilizer muscles. The positive effect of building the prime mover muscles comes at the price of sacrificing increased strength that relates to movements found in daily life.

[0005] Free weights, on the other hand, require balance and tend to promote increased activity of the stabilizer muscles. Free weights build stability and balance in a way that machines cannot. With free weights, more demands are made on more muscles to stabilize and balance the body and the weight. More work is completed per exercise, getting the body fitter, faster.

[0006] Stabilizer muscles are muscles that act to provide stability during a movement. For example, when a squat is performed, the large leg muscles are the prime movers, but other muscles help to execute the movement. Calf and foot muscles make sure the feet stay planted, torso and abdominal muscles keep you from folding up, back muscles act on the shoulder blades to balance the bar and also help to level the upper body. Free weights allow one to strengthen the body in a more even fashion, simulating real-life movements more accurately. Motor skills are also enhanced.

[0007] It is apparent that free weights and machines complement each other. Exercise routines, especially ones that focus on strength training should include exercises using both machines and free weights. Such complementary use of both weight machines and free weights is achievable when working out the upper body. However, when it comes to working out the lower body, in the past, free weights have had little use; machines were the only practical option.

[0008] There are seemingly many more leg exercises that can be performed on weight machines than can be performed with free weights. The fact that one cannot grasp or hold free weights such as barbells and dumbbells with the legs prevents the legs from benefiting from all the advantages free weights have to offer.

[0009] Conventional ankle weights are not designed to provide high levels of resistance, especially the near maximum resistance needed to build strength or muscle mass. The low level of resistance provided by ankle weights is merely helpful in increasing the intensity of an aerobic workout. Besides doing squats, strength training for the legs is relegated primarily to the use of weight machines which as discussed above fail to recruit to any significant degree the legs' stabilizer and synergistic muscles. What is needed is a

device which would permit the legs to perform a considerable assortment of exercises using free weights.

SUMMARY OF THE INVENTION

[0010] In accordance with the present invention, there is provided a device for attaching a free weight to a leg. The device comprising a lower leg assembly including a calf support member and a heel support member; a foot assembly including a foot support member and a clamp for releasably engaging a free weight; a transverse member connecting the lower leg assembly and foot assembly; and first and second straps connected to the calf support member and foot support member, respectively, the straps being releasably attachable to a leg.

[0011] Also in accordance with the present invention, there is provided a device to permit a leg to exercise with a free weight. The device comprising a lower leg brace including a calf support member, a heel support member, a beam joining the calf support and heel support members, and a leg fastener; a foot assembly including a weight bed, a clamp and a foot fastener; and a transverse member connecting the lower leg brace and foot assembly.

[0012] Another device allowing a leg to exercise with free weights is provided according to the present invention. The device comprising a lower leg assembly including a calf support, a heel support and a girder joining the calf and heel supports; a foot support member having a clamp for securely holding a barbell or dumbbell; and an adjustable transverse member connecting the leg assembly and foot support member so that a distance between the leg assembly and the foot support member can be altered to accommodate various foot sizes.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1 is a perspective view of one embodiment of the device of the present invention.

[0014] FIG. 2 is an exploded perspective view of the embodiment shown in FIG. 1.

[0015] FIG. 3 is a side elevation view of the embodiment of FIG. 1 attached to a leg and shoed foot of a seated user, with a barbell attached to the device.

[0016] FIG. 4 is similar to FIG. 3 except the leg is in the extended position of a seated leg extension exercise.

[0017] FIG. 5 is similar to FIG. 3 except the leg is in the starting position of a standing leg curl.

[0018] FIG. 6 is similar to FIG. 5 except the leg is the curled position of a standing leg curl.

[0019] FIG. 7 is a rear view of the embodiment shown in FIG. 1 with the device attached to a leg and attached via the rear hole to a pulley and cable weight machine for performing a leg adductor exercise.

[0020] FIG 8. is similar to FIG. 7 except the leg is in the extended position of the leg adductor exercise.

DETAILED DESCRIPTION OF THE INVENTION

[0021] FIG. 1 shows one embodiment of the device 10 of the present invention. The device 10 preferably has two primary sections, the lower leg assembly or brace 12 and the foot assembly 14. The leg assembly 12 is connected to the foot assembly by a transverse member 16. In the illustrated embodiment, the transverse member 16 comprises two adjustable sections, which can accommodate a range of foot sizes. Alternatively, transverse member 16 can be designed as a single unit, i.e., by having a one-piece transverse member, but such a construction would be limited to fitting a smaller range of foot or shoe sizes.

[0022] Leg assembly 12 includes a calf support member 18 (best shown in FIGS. 3-8), a heel support member 20 and a

support beam or girder 22 that connects the heel and calf support members together. Preferably, the calf support 18 and heel support 20 members are curved to provide a more comfortable and secure fit around the calf and heel. To improve comfort and fit, foam padding 24, 26 is preferably removably mounted on the sides of the calf and heel support members that face the user's leg by complementary hook and loop fastener (Velcro®) surfaces. Although other materials could be used, the calf and heel support members are made of a lightweight aluminum or aluminum alloy.

[0023] The beam 22 is also preferably made of a strong and resilient yet lightweight material such as aluminum or aluminum alloy since it is a weight-bearing member. Additionally, the transverse member also should be made of a strong, resilient and lightweight material since it, along with the beam, provides the skeletal support which keeps the foot at a comfortable angle with respect to the lower leg and prevents force from being transmitted to the ankle joint. An elongated rib 30 can also be included to reinforce beam 22 while ensuring its resiliency. Also, beam 22 is inclined toward the center so that calf support pad 24 snugly engages the calf muscle when the heel of the foot lies against the heel support pad 26, as shown in FIGS. 3 and 4.

[0024] Foot assembly 14 includes an instep plate or foot support member 32 which also acts as a weight bed. Foot support member 32 is also preferably constructed as a curved lightweight metal plate. A free weight clamp 34 is fixed to the upper surface of the foot support member 32. Padding 36 is provided on the underside of the foot support member 32, preferably removably attached by complementary hook and loop (Velcro®) surfaces. The clamp 34 has an upper sleeve half 38 with an inner stud 42 and an outer pair of lugs 44. The clamp 34 further includes a lower sleeve half 40 with an inner clevis 46 and an outer clevis 48. The stud 42 and inner

clevis 46 are connected by a hinge pin 45 so that the upper and lower sleeve halves can open and close around the bar of a barbell or dumbbell.

[0025] The outer clevis 48 has a central slot 52 as best shown in FIG. 2. Lugs 44 are separated by slot 50. Lower slot 52 has a toggle bolt 54 which is pinned to clevis 48. The toggle bolt 54 can pivot in and out of upper slot 50 when sleeve half 38 is in the lowered or closed position. T-shaped locking nut 56 threads over the toggle bolt 54. As locking nut 56 is tightened down, it contacts the lugs 44 of upper sleeve half 38 and urges the upper sleeve half into engagement with the lower sleeve half.

[0026] While many other arrangements of the clamp can be envisioned, clamp 34 allows for a quick, easy and secure method of attaching and removing barbells and dumbbells. The nut 56 does not have to be completely unscrewed or removed to change barbells or dumbbells. All that is required is a few turns to loosen the engagement between the lugs 44 and the locking nut 56 and toggle bolt 54 can be pivoted out of the slot 50, permitting the sleeve halves to open.

[0027] A rubber liner 58 or any friction enhancing material is also preferably included on the inner surfaces of the sleeve halves to prevent any undesirable rotation of a barbell or dumbbell. Also, some dumbbells utilize hexagonal bars and the liner 58 improves the grip of the clamping mechanism around such uneven surfaces. Although one embodiment of the free weight clamp has been shown, the term clamp as used in the present invention is broad enough to encompass other arrangements of holding a free weight to the foot support. The term "free weight" is meant to encompass not only barbell and dumbbell type weights but also the individual weight plates or discs that are added to a bar.

[0028] In one alternate arrangement for the clamp, a standard diameter weight bar is fixedly attached to the foot support.

The bar may extend horizontally beyond both ends of the foot support or may extend vertically. If the bar extends vertically, conventional weight plates could be added and securely fastened to the bar with a conventional barbell locking collar. If the bar extends horizontally, conventional weight plates could be added to both ends of the bar. The weights could then be locked in place with convention barbell locking collars.

[0029] Further details of the transverse member will now be described. Transverse member 16 joins leg assembly 12 to foot assembly 14. Transverse member 16 has a front section 60 and a rear section 62 as best shown in FIG. 2. Both sections preferably have three pairs of aligned holes that match up when the front and rear sections 60, 62 are brought together in an overlapping fashion. Alternatively, only one section needs to have multiple pairs of aligned holes, while the other section can have only one pair that can be matched or aligned with any of the pairs of holes on the other section. The holes 64 allow the foot assembly to be spaced from the leg assembly by three different distances. While more holes can be used, it has been determined that the three sets of holes are adequate to accommodate a large majority of foot or shoe sizes. Pairs of bolts 66 and wing nuts 68 secure the front and rear sections together and yet allow for quick extension or retraction of the foot assembly in relation to the leg assembly.

[0030] Alternate connection arrangements are also envisioned such as using upper and lower elongated slots instead of a series of spaced apart holes, as just discussed above. This would permit more precise spacing of the leg and foot assemblies. Padding 70 is also provided on the inner surface of rear section 62 to cushion any possible contact between rear section 62 and the ankle. Such padding is preferably removably attached by hook and loop fasteners.

[0031] Rear section 62 is welded to heel support member 20, but can also be integrally formed with the heel support. Indeed, calf support 18, beam 22, heel support 20 and rear transverse section 62 may be integrally formed. Front section 60 is connected to foot support bracket 72. The bracket preferably is a triangularly shaped aluminum plate welded to foot support member 32. The shape of the bracket presents a limited profile while still providing ample engagement surfaces. The foot support member 32, bracket 72 and front section 60 may also be integrally formed.

[0032] The device 10 is preferably attached to the leg and foot using high strength polyester calf and foot straps, 74, 76 respectively, although laces, belts and/or other fibrous materials can be used. As best shown in FIG. 2., calf strap 74 is connected to the back surface of calf support member 18 by a pair of snaps 78 and snap partners (not shown) on the back of calf support member 18 so the strap may be removed for washing if necessary. Once strap 74 is connected to calf support member 18, one end is wrapped around the lower leg and fed through a D-shaped ring 80 at the opposite end of the strap and pulled tightly back to the front where complementary hook and loop fastener (e.g. Velcro®) surfaces bond the strap to itself. Calf strap 74 also preferably includes padding 92 on the inner surface of the strap which contacts the shin area of the leg.

[0033] Foot strap 76 is removably connected to foot support 32 via snap 82 which engages snap partner 84 on foot support, as shown in FIG. 2. As described above in relation to the calf strap 74, foot strap 76 wraps around the foot or shoe, is fed through D-rings 86, and pulled tight over the top of foot support where complementary Velcro® surfaces bond the foot strap to itself. While other arrangements for attaching the device to the leg are possible, the straps provide a quick, efficient and secure means of attachment. Foot strap 76 also

includes a non-slip wrap 94 so that the strap stays in place when wrapped around a shoed foot. Padding could also be included to cushion the bottom of a bare foot. However, since shoes should be worn during exercise, foot strap 76 includes only the non-slip wrap 94.

[0034] Another means of fastening the device to the leg is with a belt and buckle system or with laces. The term strap however is not limited to flexible, fibrous or woven materials. The term strap is broad enough to encompass other arrangements for attaching the device to the leg. For example, a curved rigid member or hinged member can be attached to the rear surface of the calf support member. Then the curved rigid member or hinged member can be wrapped around the lower leg and removably attached to the rear surface of the calf support member by any number of ways. One way can be with a stepped tooth and releasable latch. An over-the-center latch system can also be used. These over-the-center latches can typically be found as the latching mechanism used on tool boxes, lunch boxes and the like. Also, a locking screw can be used to frictionally engage the rigid or hinged member to the calf support plate. These same types of arrangements can be used to attach the foot support member to the foot.

[0035] The device of the present invention also preferably allows it to be used with cable and pulley type weight machines. Bracket 72 has a front opening 88 as shown in FIG. 1 and the bottom of the rib 30 has a rear opening 90 (FIGS. 3 and 4). Either of these openings can connect the device 10 to pulley machines using a standard quick-release latch 96 as shown in FIGS. 8 and 9.

[0036] While the present invention has been described in detail with reference to one embodiment, other changes and modifications may still be made without departing from the spirit or scope of the present invention. It is understood that the present invention is not to be limited by the

embodiment described herein. Instead, the true measure of the scope of the present invention is defined by the appended claims including the full range of equivalents given to each element of each claim.